CLAIMS

What is claimed is:

1. A method of treating vulnerable plaque at a site in a vessel, comprising:

identifying a vulnerable plaque site for treatment;

introducing a radiation source into a vessel containing a vulnerable plaque site identified for treatment;

guiding the radiation source to a position adjacent to the vulnerable plaque site identified for treatment; and

delivering a therapeutically effective dose of radiation to the vulnerable plaque site identified for treatment.

2. The method of claim 1 wherein the radiation source is selected from a group consisting of a radioactive wire, a radioactive strip, a radioactive pellet, a radioactive stent, a receptacle or lumen that contains radioactive material, a receptacle or lumen that receives radioactive material, a receptacle or lumen that is coated with radioactive material, and a device for delivering x-ray radiation.

3. The method of claim 1 wherein a retractable shield surrounds the radiation source when the vessel is not being treated.

4. The method of claim 1 further comprising:

first making a percutaneous access site into one of a vessel to be treated or a vessel that leads to a vessel to be treated and advancing a guiding catheter through the percutaneous access site to the vulnerable plaque site identified for treatment.

5. The method of claim 4 wherein the guiding catheter includes a guide wire at least partially enclosed by the guiding catheter.

6. The method of claim 5 wherein the radiation source is introduced over the guide wire.

7. The method of claim 5 wherein the guide wire is withdrawn prior to introducing the radiation source.

8. The method of claim 4 wherein the guiding catheter includes at least one expandable structure adjacent a distal end of the catheter.

9. The method of claim 8 wherein the expandable structure is a balloon.

10. The method of claim 8 wherein the expandable structure is expanded prior to delivering a therapeutically effective dose of radiation to the vulnerable plaque site identified for treatment.

11. The method of claim 10 wherein the expanded structure is in contact with the vessel to be treated at a location adjacent and distal to the vulnerable plaque site identified for treatment.

12. The method of claim 10 wherein the expanded structure centers the guiding catheter within the vessel to be treated.

13. The method of claim 10 wherein the expanded structure shields the vessel to be treated from radiation exposure distal to the vulnerable plaque site identified for treatment.

14. The method of claim 10 wherein the expandable structure is returned to an unexpanded state after a therapeutically effective dose of radiation has been delivered to the vulnerable plaque site identified for treatment.

15. The method of claim 1 wherein the radiation source comprises at least one element of a radiation treatment device.

16. The method of claim 15 wherein the radiation treatment device includes at least one expandable structure.

17. The method of claim 16 wherein the expandable structure is expanded prior to delivering a therapeutically effective dose of radiation to the vulnerable plaque site identified for treatment.

18. The method of claim 16 wherein the expandable structure is a balloon.

19. The method of claim 16 wherein the expandable structure shields the vessel to be treated from radiation exposure beyond the vulnerable plaque site identified for treatment.

20. The method of claim 16 wherein the expandable structure is returned to an unexpanded state after a therapeutically effective dose of radiation has been delivered to the vulnerable plaque site identified for treatment.

21. The method of claim 16 wherein the expandable structure is adjacent to a proximal end of the radiation source.

22. The method of claim 21 wherein the expandable structure is positioned within the vessel to be treated at a location adjacent and proximal to the vulnerable plaque site identified for treatment.

23. The method of claim 16 wherein the expandable structure is adjacent to a distal end of the radiation source.

24. The method of claim 23 wherein the expandable structure is positioned within the vessel to be treated at a location adjacent and distal to the vulnerable plaque site identified for treatment.

25. The method of claim 16 wherein at least one expandable structure is adjacent to a distal end of the radiation source and at least one expandable structure is adjacent to a proximal end of the radiation source.

26. The method of claim 25 wherein at least one expandable structure is positioned within the vessel to be treated at a location adjacent and distal to the vulnerable plaque site identified for treatment and at least one expandable structure is positioned within the vessel to be treated at a location adjacent and proximal to the vulnerable plaque site identified for treatment.

27. The method of claim 1 wherein delivering a therapeutically effective dose of radiation to the vulnerable plaque site identified for treatment comprises positioning the radiation source at the vulnerable plaque site and exposing the vessel to radiation while the device is stationary.

28. The method of claim 1 wherein delivering a therapeutically effective dose of radiation to the vulnerable plaque site identified for treatment comprises positioning the radiation source at a point adjacent a distal edge of the vulnerable plaque site and exposing the vessel to radiation while the device is moved axially to treat the entire area of plaque.

29. The method of claim 1 further comprising:

withdrawing the radiation source from the vessel after a therapeutically effective dose of radiation has been delivered to the vulnerable plaque site identified for treatment.

30. A system for treating vulnerable plaque at a site in a vessel, comprising:

means for identifying a vulnerable plaque site for treatment;

means for introducing a radiation source into a vessel containing a vulnerable plaque site identified for treatment;

means for guiding the radiation source to a position adjacent to the vulnerable plaque site identified for treatment; and

means for delivering a therapeutically effective dose of radiation to the vulnerable plaque site identified for treatment.

31. The system of claim 30 further comprising:

means for first making a percutaneous access site into one of a vessel to be treated or a vessel that leads to a vessel to be treated and advancing a guiding catheter through the percutaneous access site to the vulnerable plaque site identified for treatment.

32. The system of claim 30 further comprising:

means for withdrawing the radiation source from the vessel after a therapeutically effective dose of radiation has been delivered to the vulnerable plaque site identified for treatment.